Space Weather Forecast

Issued on Tuesday, 19 July 2022 at 13:30 Local

This forecast provides a four day assessment of space weather events. The probabilities stated below are for reaching or exceeding the given levels. For more information about space weather impacts please see the Met Office Space Weather Scales https://www.metoffice.gov.uk/weather/learn-about/space-weather/uk-scales

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Space Weather Forecast Headline: Chance of G1/Minor Storms mainly day 1 (19th), with a slight chance on day 3 and day 4 (21st and 22nd. Decreasing chance of M-flares (R1/R2 Radio Blackouts).

Analysis of Space Weather Activity over past 24 hours
Solar Activity: Solar activity has been Low over the last 24 hours, with only stable and inactive sunspots on the visible disc and low level Common-class flares. No Earth-directed CMEs (coronal mass ejections) have been observed on available imagery.

Solar Wind / Geomagnetic Activity: The solar wind at L1 has exhibited evidence of both a solar fast wind and CME arrival. Solar wind speeds have increased from slightly elevated to nearly elevated levels. Total magnetic field strength has been mainly moderate, with two peaks, the first reaching strong levels, indicating the onset of a CME. The north south component, Bz has varied moderately, with two moderate negative peaks. The second peak has lead to a sustained period of negative Bz. Geomagnetic activity has been mainly Unsettled, with two Active periods early on 19 July.

Energetic Particles / Solar Radiation: The count rate of energetic particles (high energy protons) remained at background with no solar radiation storms observed.

Four-Day Space Weather Forecast Summary
Solar Activity: Solar activity is forecast to be Low, with a chance of rising to Moderate from any M-flares that occur due to the number of sunspot regions on the visible disc.

Solar Wind / Geomagnetic Activity: A CME which left the Sun on 15 July may have arrived at Earth late on 18 July, but this is currently uncertain due to the potential early arrival time. A solar fast wind may also have connected with the Earth on 19 July. This fast wind is likely to decline through the next two days, but the effects of the CME may persist, and could be enhanced should there be a second CME arrival. Further fast wind connections are then possible either late day 3 or day 4. Geomagnetic activity is forecast to be Unsettled to Active with a chance of G1/Minor Storm intervals due to any further CME or fast wind enhancements. This risk recedes day 2 before a further enhancement later day 3 or more likely day 4 to Unsettled to Active with a chance of G1/Minor Storms.

Energetic Particles / Solar Radiation: The count rate of energetic particles (high energy protons) may increase due to any flares that occur, however there is only a very slight chance of reaching the level of a solar radiation storm.

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Geomagnetic Storms:

Geo-Magnetic Storm Probability (Exceedance)	Level	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Minor or Moderate	G1 to G2	No	50	30	10	30
Strong	G3	No	1	1	1	1
Severe	G4	No	1	1	1	1
Extreme	G5	No	1	1	1	1

Radio Blackouts - X Ray Flares:

X Ray Flares Probability	Level	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Active	R1-R2 M Class	No	40	35	30	30
Very Active	R3 to R5 X	No	1	1	1	1

Solar Radiation Storms - (High Energy Protons):

Radiation Storms Probability (Exceedance)	Level (cm^{-2} sr^{-1} s^{-1})	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Active	≥ S1	No	5	5	5	5
Very Active	≥ S3 *	No	1	1	1	1

* S3 ≥ 10 MeV ≥ 1000 pfu and / or ≥ 50 MeV ≥ 10 pfu. (pfu = $cm^{-2}sr^{-1}s^{-1}$)

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